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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,030	04/13/2004	Patrick C. Fenton	16437-0209U	3385

24267 7590 10/01/2007
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EXAMINER	
NGUYEN, LEON VIET Q	

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
10/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/823,030	FENTON, PATRICK C.	
	Examiner	Art Unit	
	Leon-Viet Q. Nguyen	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *10-31* is/are allowed.

6)☒ Claim(s) *1-4,8,9,32-34,37,38 and 40* is/are rejected.

7)☒ Claim(s) *5-7,35,36 and 39* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to communication filed on 8/9/07. Claims 1-40 are pending on this application.

2. Applicant's amendment overcomes the following objection/rejection:

a. Double Patenting rejection of claims 1-8, 10-17, 21, and 24-30

Response to Arguments

3. Applicant's arguments, see Remarks, filed 8/16/2007, with respect to claims 1-8, 10-17, 21, and 24-30 have been fully considered and are persuasive. The double patenting rejection of claims 1-8, 10-17, 21, and 24-30 have been withdrawn.

Response to Remarks

Regarding claim 1, applicant asserts that Lorenz does not show the phase decoder of claim 1 but rather carrier generators which do not decode values that correspond to estimated code phase angles of the samples (Remarks page 11).

Examiner respectfully disagrees.

The outputs of carrier generators 107 and 109 in fig. 4 are used to demodulate the encoded L1 and L2 signals (col. 1 lines 51-65, col. 8 lines 64-66). The carriers from the L1 and L2 signals are removed by mixers 115 and 121 as stated by applicant (Remarks page 11). However this process causes a demodulation of the received L1 and L2 signals, resulting in partially demodulated signals 117 and 123 in fig. 4 (col. 9

lines 23-25). In this sense, demodulating and decoding are interpreted to be the same since the signals are encoded with a P-Code or a C/A-code. Therefore Lorenz does teach the code phase decoder as claimed in claim 1.

Regarding claims 32 and 37, applicant asserts that Underbrink does not show a step of selectively combining the measurements into ranges that span all or a portion of a code chip, the ranges being based on estimated code phase angles of the samples (Remarks page 12).

Examiner respectfully disagrees.

On page 5 lines 11-13 of applicant's specification, the code phase angles are defined to be specific ranges of locations in which signal samples are taken. Furthermore it is well known in the art that in spread spectrum communications, distinct codes are used to differentiate phase angles of each portion of a signal. Underbrink discloses performing calculations for in-phase and quadrature portion of *each* signal sample of a spread spectrum signal (¶0013). This would mean that there are multiple signal samples, which must fall in some range. Each signal sample has an in-phase and quadrature portion, which are well known to have a specific phase angle and a code associated with that phase angle. Therefore the range is interpreted to be based on the codes of the phase angles. Furthermore, the adder summing a first and second product corresponding to a first and second sample is interpreted to be selectively combining (¶0013).

Regarding claim 2, applicant asserts that Stansell does not include a code phase decoder and the combination of Lorenz and Stansell does not teach a system that includes a code phase decoder (Remarks page 12).

Examiner respectfully disagrees.

See the response to the arguments of claim 1 above.

Regarding claim 3, applicant asserts that Zhengdi does not provide to the Lorenz system a code phase decoder (Remarks pages 12-13).

Examiner respectfully disagrees.

See the response to the arguments of claim 1 above.

Regarding claim 4, applicant asserts that Harms does not add to the Lorenz patent missing the code phase decoder (Remarks page 13).

Examiner respectfully disagrees.

See the response to the arguments of claim 1 above.

Regarding claims 8 and 9, applicant asserts that Fenton does not terach the code phase decoder that is missing from the Lorenz system (Remarks page 13).

Examiner respectfully disagrees.

See the response to the arguments of claim 1 above.

Regarding claims 33 and 34, applicant asserts that the Sanderford system does not add to the Underbrink method step of selectively combining the measurements into ranges that span all or a portion of a code chip, the ranges being based on estimated code phase angles of the samples (Remarks page 14).

Examiner respectfully disagrees.

See the response to the arguments of claim 32 above. Furthermore, the correlation function, as seen as the dashed line 102 in fig. 1, is a received correlation signal (col. 4 lines 33-36). For the signal to be received, it would be obvious to have a direct path from the transmitter to the receiver.

Regarding claim 38, applicant asserts that the combination of teachings of the Underbrink and Kohli references does not add to the Underbrink missing step of selectively combining the measurements into ranges that span all or a portion of a code chip, the ranges being based on estimated code phase angles of the samples (Remarks page 15).

Examiner respectfully disagrees.

See the response to the arguments of claim 32 above.

Regarding claim 40, applicant asserts that the combination of teachings of the Underbrink and Fenton references does not add to the Underbrink missing step of selectively combining the measurements into ranges that span all or a portion of a code

chip, the ranges being based on estimated code phase angles of the samples (Remarks page 15).

Examiner respectfully disagrees.

See the response to the arguments of claim 32 above.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Lorenz et al (US5134407).

Re claim 1, Lorenz discloses a pre-correlation filter for a receiver that receives spread-spectrum signals, the filter including:

an array of complex accumulation registers (accumulators 151 and 155 in fig. 4) that over multiple code chips accumulate measurements that correspond to samples of the received signal (col. 9 line 63 – col. 10 line 4, L1 and L2 are interpreted to be the received signals), the accumulation registers being associated with code chip ranges that span all or a portion of a code chip (col. 9 line 63 – col. 10 line 4, the A-code is interpreted to be the code chip range);

a code phase decoder (carrier generators 107 and 109 in fig. 4) that controls the respective complex accumulation registers to direct respective measurements to the complex accumulation registers that are associated with the code chip ranges from which the samples are taken, the code phase decoder decoding values that correspond to the estimated code phase angles of the sample (col. 9 lines 7-22 and col. 13 lines 22-34, the replica of the L1 and L2 signals are interpreted to be estimates of the signals. Furthermore it is well known in the art that in spread spectrum communications, distinct codes are used to differentiate phase angles of each portion of a signal).

3. Claims 32 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Underbrink et al (US20050025222).

Re claim 32, Underbrink discloses a method of producing measurement pulse shapes associated with code chips of a PRN code in a received signal, the method including the steps of:

over multiple PRN code chips (¶0013, "one of the PN code chips" it is interpreted to mean that there is more than one code chip) taking measurements that correspond to samples of the received signal (¶0013, the selected portion of the signal sample is interpreted to be a measurement corresponding to that sample); and

selectively combining the measurements into ranges that span all or a portion of a code chip (¶0013, the adder adding the first and second product which corresponds to the measurements from the first and second signal samples), the ranges being based

on estimated code phase angles of the samples (¶0014. Underbrink discloses that each pair of signal samples has an in-phase and quadrature-phase portion, which is well known to have a phase angle. Therefore it is interpreted that the range is based on the phase angles. Furthermore it is well known in the art that in spread spectrum communications, distinct codes are used to differentiate phase angles of each portion of a signal).

Re claim 37, Underbrink discloses a method wherein the step of taking measurements includes taking measurements that correspond to inphase samples and quadrature samples (¶0013 - ¶0014, the selected portion of the signal sample is interpreted to the measurements and each signal sample includes an in-phase and quadrature-phase portions).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lorenz et al (US5134407) and further in view of Stansell, Jr. (US5963582).**

Re claim 2, Lorenz fails to teach a pre-correlation filter wherein the code chip

ranges covering a rising edge of the code chip are smaller than the code chip ranges covering other sections of the code chip. However Stansell, Jr. teaches the leading edge of a code chip being smaller than other sections of the code chip (fig. 36G, col. 43 lines 15-17).

Therefore taking the combined teachings of Lorenz and Stansell, Jr. as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the smaller leading edge of a code chip of Stansell, Jr. into the pre-correlation filter of Lorenz. The motivation to combine Stansell, Jr. and Lorenz would be to simplify the logic (col. 43 lines 18-19).

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lorenz et al (US5134407) and further in view of Zhengdi (US6751247).

Re claim 3, Lorenz fails to teach a pre-correlation filter wherein the code chip ranges are adjustable. However Zhengdi teaches changing a code chip frequency, interpreted to be the code chip range, according to the duration in time of the spreading code and according to the chip length (col. 4 lines 29-33).

Therefore taking the combined teachings of Lorenz and Zhengdi as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the adjustable code chip frequency of Zhegdi into the pre-correlation filter of Lorenz. The motivation to combine Zhengdi and Lorenz would be to reduce correlation between the spreading codes (col. 4 lines 33-34) and detect the signal better (col. 4 line 41).

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lorenz et al (US5134407) and further in view of Harms et al (US6493376).

Re claim 4, Lorenz fails to teach a pre-correlation filter wherein the sizes, numbers and starting points of the code chip ranges are selectively varied. However, in ¶0049 of applicant's specification, varying of the length, number, and/or starting position of the ranges is achieved by changing the code offset values associated with the accumulators.

Harms teaches an accumulator which generates the correlation of the data at each possible local PN code offset time (col. 24 lines 2-5). Although not explicitly stated, one of ordinary skill in the art would have found it obvious and necessary to change the code offset values corresponding to the code offset times.

Therefore taking the combined teachings of Lorenz and Harms as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the changing of code offset values of Harms into the pre-correlation filter of Lorenz. The motivation to combine Harms and Lorenz would be to differentially detect phase shifts between consecutive accumulated signals (col. 6 lines 8-12).

8. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lorenz et al (US5134407) and further in view of Fenton et al (US5390207).

Re claim 8, Lorenz fails to teach a pre-correlation filter wherein the respective complex accumulation registers include inphase registers that collect measurements

that correspond to inphase samples and quadrature phase registers that collect measurements that correspond to quadrature samples. However, Fenton teaches wherein the respective complex accumulation registers include inphase registers (register 244i in fig. 6) that collect measurements that correspond to inphase samples and quadrature phase registers (register 244q in fig. 6) that collect measurements that correspond to quadrature samples.

Therefore taking the combined teachings of Lorenz and Fenton as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the inphase and quadrature registers of Fenton into the pre-correlation filter of Lorenz. The motivation to combine Fenton and Lorenz would be to perform low frequency filtering (col. 10 lines 56-57), which is well known in the art to reduce noise.

Re claim 9, Lorenz fails to teach a pre-correlation filter wherein the accumulated measurements from the array of complex accumulators are compared with a predetermined reference shape to detect the presence or absence of interfering signals. However Fenton teaches wherein the array of complex accumulation values (col. 10 lines 56-57, the I_D and Q_D data) are compared with a predetermined reference shape (col. 10 lines 56-57, the low frequency filtering function is interpreted to be the reference shape).

Therefore taking the combined teachings of Lorenz and Fenton as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was

made to incorporate the comparison method of Fenton into the pre-correlation filter of Lorenz. The motivation to combine Fenton and Lorenz would be to perform low frequency filtering (col. 10 lines 56-57), which is well known in the art to reduce noise.

9. Claims 33 and 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Underbrink et al (US20050025222) and further in view of Sanderford et al (US5764686).

Re claim 33, Underbrink fails to teach a method further including the step of determining an estimated location of the chip edges in a direct path signal. However Sanderford teaches correlation peak information which comes from a portion of a chip time or a whole chip time (col. 4 lines 48-52) to estimate a leading edge of the correlation function (col. 4 lines 50-52). The correlation function is interpreted to be the direct path signal.

Therefore taking the combined teachings of Underbrink and Sanderford as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the edge determining method of Sanderford into the method of Underbrink. The motivation to combine Underbrink and Sanderford would be to shorten the dwell time required when taking additional samples of the leading edge of a correlation function (col. 5 lines 35-39).

Re claim 34, the modified invention of Underbrink teaches a method further including the step of narrowing the ranges that are associated with the chip edges (col. 1 lines 43-46, the chip time is interpreted to be the chip range).

10. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Underbrink et al (US20050025222) and further in view of Kohli et al (US6466612).

Re claim 38, Underbrink fails to teach a method wherein the step of combining further includes combining the measurements to produce one or more early correlation values and one or more late correlation values for use in correlating a local PRN code to the received PRN code and a local carrier to a received carrier. However Kohli teaches combining the measurements to produce one or more early correlation values and one or more late correlation values (col. 17 lines 25-28) for use in correlating a local PRN code to the received PRN code and a local carrier to a received carrier (col. 1 line 66 – col. 2 line 17).

Therefore taking the combined teachings of Underbrink and Kohli as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the production and use of early and late correlation values of Kohli into the method of Underbrink. The motivation to combine Underbrink and Kohli would be to accurately maintain the synchronization of prompt correlation (col. 2 lines 15-17).

11. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Underbrink et al (US20050025222) and further in view of Fenton et al (US5390207).

Re claim 40, Underbrink fails to teach a method further including the step of comparing the combined measurements with a predetermined reference shape to detect the presence or absence of interfering signals. However Fenton teaches comparing the combined measurements (col. 10 lines 43-48, the I_D and Q_D data coming from the addition of two measurements as seen in the equations) with a predetermined reference shape (col. 10 lines 56-57, the low frequency filtering function is interpreted to be the reference shape).

Therefore taking the combined teachings of Underbrink and Fenton as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the comparison method of Fenton into the method of Underbrink. The motivation to combine Fenton and Underbrink would be to perform low frequency filtering (col. 10 lines 56-57), which is well known in the art to reduce noise.

Allowable Subject Matter

12. Claims 5-7, 35, 36, and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. Claims 10-31 are allowed.

14. The following is an examiner's statement of reasons for allowance: the allowable subject matter in claims 10 and 21 pertain to a pre-correlation filter that includes an array of complex accumulation registers that collect measurements that correspond to

samples of the received signal, the accumulation registers being associated with code chip ranges that span all or a portion of a code chip; a code phase decoder that controls the complex accumulation registers to direct the measurements to the respective complex accumulation registers that are associated with the code chip ranges from which the associated samples are taken, the code phase decoder decoding values that correspond to the estimated phase angles of the samples; and a multipath mitigation processor that uses the measurements collected by the complex accumulation registers to produce code multipath error signals and carrier multipath error signals.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon-Viet Q. Nguyen whose telephone number is 571-270-1185. The examiner can normally be reached on monday-friday, alternate friday off, 7:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon-Viet Nguyen/
Assistant Examiner Art Unit 2611

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